TOLEDO DEPARTMENT OF ENVIRONMENTAL SERVICES
AIR POLLUTION MALFUNCTION/SCHEDULED MAINTENANCE REPORT
REFERENCE: OAC RULE 3745-15-06(A) & (B)

Report Initiated by: Allen Ellett - Date: 08/28/2020
Facility Name: BP-Husky Refining LLC - Toledo Refinery Time: 16:00
Address: 4001 Cedar Point Road, Oregon OH Phone: (312) 809-4038
TDEC Staff: Mr. Peter Park

1. Source Description:

ID of Equipment: P007 FCCU / CO Boiler / ESP .

OEPA Permit No.: 0448020007 (Ohio EPA Title V Permit)

Malfunction/Maintenance Description:

The CO Boiler has developed one or more leaks in the generating bank of boiler tubes. The exact number and nature of leaks is uncertain until the CO Boiler can be shut down for inspection and repairs. The leak(s) are being monitored by the operations team, but it is unlikely that the CO Boiler will be able to continue to operate until the next scheduled turnaround planned for April 22, 2022. Therefore, the CO Boiler will need to be shut down sooner in order to repair the leak(s). The CO Boiler is part of the Fluid Catalytic Cracking Unit (FCCU) and combusts carbon monoxide within the flue gas of the FCCU Regenerator to form carbon dioxide and provides steam to the refinery by recovering the heat in the flue gas. The exhaust gases from the CO Boiler pass through an electrostatic precipitator (ESP), which removes fine particulate matter (PM) generated by the FCCU and thereby also reduces opacity prior to flue gas being discharged to the atmosphere. Due to the configuration of the unit, the ESP cannot be used and is bypassed when the CO Boiler is shut down for repairs. During a shutdown of the CO Boiler and ESP, the exhaust from the FCCU Regenerator will be discharged to atmosphere through the bypass stack. While the bypass stack is in use, continuous emission monitors (CEMS) located in the FCCU Regenerator off gas line will continue to measure SO_2, NO_x, and CO and a continuous opacity monitor (COMS) located in the bypass stack measures opacity. We plan to have a monitoring contractor install temporary monitoring equipment (CEMs) for SO_2, NO_x, and CO in the bypass stack to serve as a backup in case the CEMs in the Regenerator offgas line develop problems that would affect their reliability. The refinery is requesting to continue to operate the FCCU while the ESP and CO Boiler are shut down, since it is not possible to operate the ESP while the CO Boiler is not operating.

The refinery would like to continue to operate the FCCU while the CO Boiler and ESP are shut down, since a shutdown of the FCCU would result in the shutdown of several upstream process units in the refinery. Current market conditions related to the reduction in use of transportation fuels have created storage limitations for the streams created in the units that are feed for the FCCU, and these limitations would result in the shut down of those units. The shutdown of the FCCU would also result in the shutdown of several downstream process units due to the lack of streams produced by the FCCU that are feed to these units. Current estimates suggest that the entire Toledo Integrated Unit (TIU) would have to be shut down if the FCCU has to be shut down for the length of time required to make the repair to the Boiler.

The refinery estimates that the FCCU can be operated in compliance with all of its current emissions limits, with the exception of particulate and opacity limits, based on past experience. A detailed analysis of the emissions associated with the operation of the FCCU without the CO Boiler and ESP is provided below. While the CO Boiler and ESP are shut down, the refinery

would make every effort to operate the FCCU in compliance with its SO_2, NO_x, and CO limits while following good air pollution control practices in order to minimize the PM emissions and opacity.

2. Estimated & Actual Duration of Malfunction:

(A) Estimated Duration (dates & times) September 8, 2020 to October 13, 2020.

(B) Actual duration (dates & times) to be determined upon completion of repairs and startup of COB and ESP

3. Type of Report/Request (check one)

☒ **A. Scheduled Maintenance Request:**

TDES Response
(attach letters, conversation record)

Approval Date: _____
Denial Date: _____
Information Request Date: N/A

B. Malfunction Report:

If duration of malfunction is greater than 72 hours, indicate date of:

(i) written notification of malfunction:_____

(ii) written notification of correction: _____
submission of corrective program:_____

If actual duration is less than 72 hours, indicate the date of the oral/written notification of the correction of malfunction: _____

4. Nature and Estimated Quantity of Air Contaminants Emitted:

The CO Boiler and ESP control emissions from the FCCU. Due to its configuration, the ESP cannot be operated when the CO Boiler is out of service. Accordingly, the refinery would like to operate the FCCU while the CO Boiler and ESP are shut down. All steps will be taken to ensure that the refinery is operating in compliance with the SO_2, NO_x, and CO limits that apply to the FCCU, and the refinery will follow good air pollution control practices to minimize PM emissions and opacity from the FCCU. The refinery will use the existing CEMs located near the Regenerator outlet to monitor the SO_2, NO_x, and CO emissions, and is planning to install temporary back-up CEMs for these pollutants in the bypass stack to provide additional assurance that emissions data will be available in the event that one of the CEMs has an issue that would prevent it from monitoring its respective pollutant.

CO emissions will be minimized by operating the FCCU Regenerator in full burn mode, which will provide sufficient oxygen and heat to the catalyst in the Regenerator to ensure that the carbon on the catalyst is being combusted to CO_2 before it is emitted to the atmosphere. CO promoter catalyst will also be used to help minimize the CO emissions during the boiler outage. The refinery will continue to hydrotreat the feed to the FCCU to minimize the emission of SO_2, and also monitor the feed rate and operation of the FCCU to minimize NO_x and PM emissions and opacity.

Emissions from the operation of the FCCU by itself without the CO Boiler during the 30-day period are shown in the table below along with the current permit allowable emissions for the period. The estimated excess emissions are based on the last time the CO Boiler was shut down while the FCCU continued to run and adjusted to reflect the length of time that the CO Boiler will be down.

Case	SO_2 (Tons)	NO_x (Tons)	PM (Tons)	CO (Tons)
Allowable Emissions	66.88	17.36	33.03	91.20
Estimated Actual Emissions	10.08	14.73	38.45	53.72

5. Shutdown or Reduction of Source operation (check one)

Shutdown: _____ Reduction: ___X_____ Neither: _____

If neither, why is shutdown or reduction impossible or impractical?

The CO Boiler and ESP will need to be shut down in order to make repairs to the CO Boiler. The feed rate and operation the FCCU will be managed in order to maintain SO_2, NO_x, and CO emissions below applicable limits, and to minimize PM emissions and opacity using good air pollution control practices. Shutting down the FCCU would require the shut down of the entire TIU (a major portion of the refinery) shortly after the FCCU is shut down due to lack of storage for intermediate streams.

6. Estimated Breakdown Period Reasonable? **Yes** ___X_____ **No** _____

Explain:

All efforts will be made in the planning process to complete this maintenance as quickly as feasible, in a safe and practicable manner. Work will progress 24 hours per day, 7 days per week while the unit is down. All work that can be done prior to shutting down the boiler will be done prior to the outage in anticipation of the repair work.

7. List Alternative Operating Procedures and Interim Control Measures:

See above.

8. List All Applicable Preventive Maintenance and Malfunction Abatement Plans Implemented:

None applicable.